

This listing of the claims will replace all prior versions, and listings, of claims in the.

**Listing of Claims:**

1 1. (amended) A valve assembly comprising a valve body with an inlet and an outlet  
2 port, a partition wall having a valve seat separating said valve body into a first flow  
3 passage and a second flow passage; a piston, having a throughbore including an orifice,  
4 reciprocally mounted in said valve body, said piston being gradually movable between a  
5 first position and a second position; a modulating plug in conjoining contact with said  
6 piston, reciprocally mounted in said valve body and gradually movable between an open  
7 position, permitting fluid flow from said first flow passage to said second flow passage,  
8 and a closed position engaging said valve seat, blocking fluid flow from said first flow  
9 passage to said second flow passage; ~~[[and]]~~ a valve cover adjoining said valve body;  
10 ~~wherein the improvement comprises~~ and a throttling member connected with said valve  
11 cover and extending into said throughbore and said orifice, adapted to insure a gradual  
12 alteration of the cross-sectional area of said orifice upon reciprocation of said piston  
13 between said first and second positions.

1 2. (original) The valve assembly as in claim 1 wherein said valve cover has a  
2 throughbore, for receiving a pilot fluid flow, aligned with said piston throughbore.

1 3. (original) The valve assembly as in claim 1 wherein said valve body has a  
2 connecting passage leading from said first flow passage to a gap between said valve body  
3 and said valve cover.

1 4. (original) The valve assembly as in claim 1 wherein said gradual alteration of  
2 the cross-sectional area of said piston orifice is proportional to the volume of a pilot fluid  
3 flow passing through said orifice in said piston.

1        5.        (original)        The valve assembly as in claim 1 wherein said gradual alteration of  
2        the cross-sectional area of said piston orifice is accompanied by a gradual movement of  
3        said modulating plug between said opening position and said closed position.

1        6.        (original)        The valve assembly as in claim 1 wherein the cross-sectional area  
2        of said piston orifice changes for each position of said piston between said first and said  
3        second positions.

1        7.        (original)        The valve assembly as in claim 1 wherein the permissible volume  
2        of a pilot fluid flow changes with each position of said piston between said first and said  
3        second positions.

1        8.        (original)        The valve assembly as in claim 1 wherein at said piston first  
2        position, said piston orifice is substantially fully closed, and in said second position said  
3        piston orifice is in its maximum open position.

1        9.        (original)        The valve assembly as in claim 2 wherein said valve cover  
2        throughbore includes a passage for directing pilot fluid flow into said piston throughbore.

1        10.       (original)        The valve assembly as in claim 1 wherein said throttling member  
2        is a tapered pin which is received within said piston throughbore.

1        11.       (original)        The valve assembly as in claim 1 wherein said throttling member  
2        is a pin having a cross-sectional area that gradually decreases from its top to its bottom.

1        12.       (amended)        The valve assembly as in claim 1 wherein said throttling member  
2        ~~is a fixed disk~~ has a constant diameter of a predetermined size which is received within  
3        said piston throughbore and said piston throughbore has a cross-sectional area that  
4        gradually increases from a first end to a second end.

1     13.     (original)     A valve assembly comprising:  
2             a valve body with an inlet and an outlet port having a partition wall with a valve  
3     seat separating said valve body into a first flow passage and a second flow passage;  
4             a piston, having a throughbore including an orifice, reciprocally mounted in said  
5     valve body and movable between a first position and a second position;  
6             a modulating plug in abutting contact with said piston, reciprocally mounted in  
7     said valve body and gradually movable between an open position, permitting fluid flow  
8     from said first flow passage to said second flow passage, and a closed position engaging  
9     said valve seat, blocking fluid flow from said first flow passage to said second flow  
10    passage;  
11            a valve cover adjoining said valve body; and  
12            a throttling member, connected to said valve cover and extending into said  
13    throughbore and through said orifice, adapted to insure a gradual alteration of the cross-  
14    section of said piston orifice upon reciprocation of said piston between said first and  
15    second positions.

1     14.     (original)     The valve assembly as in claim 13 wherein said valve cover has a  
2     throughbore, for receiving a pilot fluid flow, aligned with said piston throughbore.

1     15.     (original)     The valve assembly as in claim 13 wherein said valve body has a  
2     connecting passage leading from said first flow passage to a gap between said valve body  
3     and said valve cover.

1     16.     (original)     The valve assembly as in claim 13 wherein said gradual alteration  
2     of the cross-section of said piston orifice provides a gradual movement of said  
3     modulating plug between said opening position and said closed position.

1     17.     (original)     The valve assembly as in claim 13 wherein the cross-section of  
2     said piston orifice changes for each position of said piston between said first and said  
3     second position.

1 18. (original) The valve assembly as in claim 13 wherein the permissible volume  
2 of a pilot fluid flow changes with each position of said piston between said first and said  
3 second position.

1 19. (original) The valve assembly as in claim 13 wherein said throttling member  
2 is a tapered pin which is received within said piston throughbore.

1 20. (original) The valve assembly as in claim 13 wherein said gradual alteration  
2 of the cross-sectional area of said piston orifice is proportional to the volume of said pilot  
3 flow passing through said piston orifice.

1 21. (original) The valve assembly as in claim 13 wherein said gradual alteration  
2 of the cross-sectional area of said piston orifice changes with the travel of said piston.

1 22. (original) The valve assembly as in claim 13 wherein said gradual alteration  
2 of the cross-sectional area of said piston is linear.

1 23. (original) The valve assembly as in claim 13 wherein said gradual alteration  
2 of the cross-sectional area of said piston is non-linear.

1 24. (original) The valve assembly as in claim 13 wherein at said piston first  
2 position, said piston orifice is substantially fully closed and in said second position said  
3 piston orifice is in its maximum open position.

1 25. (original) The valve assembly as in claim 13 wherein said throttling member  
2 has a cross-sectional area that gradually decreases from a first end to a second end.

1 26. (amended) The valve assembly as in claim 13 wherein said throttling member  
2 ~~is a fixed disk~~ has a constant diameter of a predetermined size which is received within

3 said piston throughbore and said piston throughbore has a cross-sectional area that  
4 gradually increases from a first end to a second end.

1 27. (original) A method of gradually opening a modulating plug of a valve  
2 assembly, said valve assembly including a valve body having a main fluid flow passage  
3 extending therethrough, a valve cover, a throttling member connected to said valve cover,  
4 a reciprocable piston having a throughbore including an orifice, which receives said  
5 throttling member therethrough, said modulating plug having an upper end in abutting  
6 contact with said piston, said method comprising the steps of:

7 a. directing a flow of pilot fluid into a restricted gap adjoining an outer end  
8 of said piston;

9 b. increasing said pilot fluid forces on a first end of said piston, gradually  
10 moving said piston and said modulating plug, reciprocally mounted in said valve body,  
11 between a first position and a second position, wherein said first position includes having  
12 said throttling member substantially closing said throughbore piston orifice;

13 c. equalizing the forces acting upon said modulating plug;

14 d. gradually increasing the pilot fluid flow forces indirectly acting upon the  
15 upper end of said modulating plug such that said modulating plug gradually moves to a  
16 fully opened position; and

17 e. gradually opening said main fluid flow passage within said valve body.

1 28. (original) The method as in claim 27 wherein the step of gradually increasing  
2 the forces comprises increasing the amount of fluid flow passing through said piston  
3 orifice.

1 29. (original) The method as in claim 27 wherein said modulating plug gradual  
2 movement is proportional to the volume of pilot fluid flow introduced to said valve  
3 assembly.

1 30. (original) The method as in claim 27 wherein said gradual increase in pilot  
2 fluid forces indirectly acting upon the upper end of said modulating plug is a linear  
3 increase.

1 31. (original) The method as in claim 27 wherein said equalization of fluid  
2 forces indirectly acting upon said modulating plug occurs substantially simultaneously  
3 with movement of said piston.

1 32. (original) The method as in claim 27 wherein said equalization of fluid  
2 forces indirectly acting upon said modulating plug is reactive to an increase in forces  
3 acting upon said piston.

1 33. (original) The method as in claim 27 wherein said gradual increase in pilot  
2 fluid force indirectly acting upon the upper end of said modulating plug is a non-linear  
3 increase.

1 34. (original) A valve assembly comprising:  
2 a valve body with an inlet and an outlet port having a partition wall with a valve  
3 seat separating said valve body into a first flow passage and a second flow passage;  
4 a piston having a throughbore including an orifice, reciprocally mounted in said  
5 valve body and movable between a first position and a second position;  
6 a modulating plug in abutting contact with said piston, reciprocally mounted in  
7 said valve body and movable between an open position, permitting fluid flow from said  
8 first flow passage to said second flow passage, and a closed position engaging said valve  
9 seat, blocking fluid flow from said first flow passage to said second flow passage;  
10 a valve cover adjoining said valve body; and  
11 a throttling member, connected to said valve cover, adapted to insure one of a  
12 linear and non-linear altering of said piston orifice cross-sectional area upon movement  
13 of said piston.

1     35.     (original)     The valve assembly as in claim 34 wherein said valve cover has a  
2     throughbore, for receiving a pilot fluid flow, aligned with said piston throughbore.

1     36.     (original)     The valve assembly as in claim 34 wherein said valve body has a  
2     connecting passage leading from said first flow passage to a restricted gap adjoining an  
3     outer end of said piston.

1     37.     (original)     The valve assembly as in claim 34 wherein said throttling member  
2     is a pin, having various cross-sections that are separated with a plurality of steps, received  
3     by said piston throughbore.

1     38.     (original)     The valve assembly as in claim 34 wherein said altering of the  
2     opening of said piston orifice cross-sectional area is substantially reactive to the volume  
3     of said pilot flow passing through said piston orifice.

1     39.     (original)     The valve assembly as in claim 34 wherein in said piston first  
2     position, said piston orifice is substantially closed and in said second position said piston  
3     orifice is in its furthestmost open position.

1     40.     (original)     The valve assembly as in claim 34 wherein said modulating plug  
2     movement from said closed position to said open position is non-linear.

1     41.     (original)     The valve assembly as in claim 34 wherein said modulating plug  
2     movement from said closed position to said open position is linear.